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The determinants of bank profitability: dynamic panel evidence from South Asian countries

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Abstract:

Using the GMM estimator, this paper empirically studies the bank-specific, industry specific and macroeconomics specific determinants of bank profitability of 259 commercial banks in the South Asian countries (Bangladesh, India, Nepal and Pakistan) in the period of 1997-2012. Empirical results show a low level of profit persistency and a late-hit of the global financial crisis in the banking sector in the region. We found no evidence for the traditional SCP hypothesis in relation to banking profit but financial solvency and managerial excellence have positive affiliation. Cost of fund, liquidity, funding gap, term structure of interest rate and economic growth rate found negative influence while rate of inflation positively affect bank profit. Also to report that South Asian banks are operating with 'inefficient' manpower.

Key words: Bank profitability, Term structure of interest rate, Dynamic panel

JEL classification: C23, G21, L2

1. Introduction:

Due to increased pressure of globalization, deregulation, parallel competition from the non-banking financial institutions and volatile market dynamics, commercial banks constantly seek ways to remain profitable. Profitable banks can diversify their business, effectively can hedge against adverse effects and can reward its stakeholders in many ways. So, understanding and regularly updating knowledge regarding the determinants of banking profitability is very important to the excellent bank management for the existence and stability of banking firm as a financial intermediary and an importance contributor to the economic development of a country.

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Thus, the research on the determinants of banking profitability seems Greenfield to the researchers, bank management, financial market analysts and the regulators in the past and also will be equally attracted in the future.

Past research on the determinants of banking profitability focused on both the bank specific and industry and macroeconomic specific variables. Following Short (1979) and Bourke (1989) a number of researchers studied banking profitability determinants using single linear model of either cross country or on country specific banking data. Among others, Molyneux and Thornton (1992) examined the determinants of banks profitability operating in 18 European countries over the period 1986-1989 and Pasiouras et al. (2007) studied that of 15 EU countries. On the other hand, panel studies of Athanasoglu et al. (2008) and Dietrich et al. (2011) are on the banking profitability of Greek and Switzerland respectively. However, no single study was out of criticism due to insufficiently selection of variables or failure to implement the appropriate econometric methodology counting for profit persistency of banks (Athanasoglu, 2008).

In this paper, we empirically studied the determinants of banking profitability of South Asian countries that is Bangladesh, India, Nepal and Pakistan, using dynamic panel of 259 banks data for the period of 1997-2012. We viewed each country's banking sector in terms of a single representative agent and interested in profit determination in national basis. We studied the explanatory variables of banking profit determinants in terms of bank specific, industry specific and macroeconomic specific and incorporated new bank specific determinant-recurring earning power of bank and found that it positively and significantly affect banking profit.

Selection of our sample was also notable on the ground that most of our sample countries (Bangladesh, India and Pakistan) were under the rule of British colony for around two hundred

years. We got the opportunity to study those countries' banking systems all –together considering likely regulatory, social and economic environments. In the near past we found similar studies on developed and developing countries of America, Europe, and Asia but in case of South Asia, this study is a unique addition to the literature of the determinants of banking profitability.

The rest of the paper has been organized as follows: in section 2, we presented relevant literature on the determinants of bank profitability. In section 3 the empirical approach of our study and in section 4 the sample description has been outlined. In section 5 the result and finally in section 6 we presented the conclusion and policy implications of our study.

2. The literature on the determinants of bank profitability

Following Short (1979), Smirlock (1985) and Bourke (1989) previous literature viewed the bank profitability as a function of bank specific, industry specific and macroeconomic specific determinants. The bank specific variables may be termed as the microeconomic variables and can be directly found in the financial statements of a bank. On the other hand, the industry and the macroeconomic variables are the overall industry condition, regulatory and legal environment and the country specific conditions within which a bank operates its business. Explanatory variables used in the studies of banking profitability determinants found either to be categorical or related to the purpose of the study and the empirical researches focused on both the cross country studies and the studies on country specific data.

Studies by Molyneux and Thornton (1992), Demirguc-Kunt and Huizinga (1999), Abreu and Mendez (2002), Staikouras and Wood (2004), Goddard et al. (2004), Pasiouras and Kosmidou

(2007) on bank profitability determinants investigated the cross country panel. On the other hand recent studies by Berger (1995), Naceur and Goaied (2008), Athanasoglu et al. (2008), Dietrich et al. (2011) were among others on the single country's banking profitability determinants. Studies of Flannery (1981, 1983), Hanweck et al. (1984), Fraser et al. (2002), among others focused on the relationship between the volatility of market interest rates and the banking profitability. Outcome of the previous studies vary in terms of data set, type of data, period of study, set of explanatory variables and countries or region but have some commons as well.

Empirical studies on the determinants of banking profitability focus on the size, capital holdings or the equity to total assets ratio, credit risk, liquidity position and other operational efficiency indicators as the microeconomic determinants and the ownership structure, concentration indices, inflation, economic growth, regulatory policy rate, market interest rates as the industry and macroeconomic determinants.

Short (1979) in his paper examines how industry specific and the macroeconomic determinants like ownership structure, industry composition, monetary policy rate, interest rate along with bank specific asset growth significantly affect banking profit. Bourke (1989) study did not confirm the findings of Short (1979) but found evidence to support the Edward-Heggested-Mingo hypothesis[2].

Flannery (1981, 1983) found that large banks are well hedged against the interest rate volatility that means when market rates change, their revenues and costs adjust equally quickly, leaving net current operating earnings largely un- affected. However, Hanweck et al. (1984)

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[2] The Edward-Heggested-Mingo theory [Edward and Heggested (1973); Heggested and Mingo (1976)] that higher concentration in banking markets encourages banks to hold less risky assets and to modify their behavior in other ways.

evidenced those small commercial banks as a group has experienced increases profitability both absolute and relative to large banks in periods of rising interest rates.

The studies of Molyneux and Thornton (1992) in their cross country studies on European banking found positive relationship between the bank profit and the level of interest rates, bank concentration, ownership and the expense preference hypothesis[3].

In their seminal paper on commercial bank margin and profitability determinants, Demirguc-Kunt and Huizingla (1999) shows that the level of equity holdings, foreign ownership, GDP per capita, real interest rate, tax rate affect bank profit positively and significantly while the loans to total assets ratio, off-balance sheet income, customer and short term funding to total assets, overhead expenses and taxation reserves have significant inverse relationship with banking profit and the results also vary in developed and developing countries. Abreu and Mendez (2002) studied the profitability determinants of European banking and found that loan to assets and equity to assets ratio have positive impact on bank profit while unemployment affect negatively. Staikouras and Wood (2003) also studied the European banking profitability and their results show that among bank specific determinants loan to assets ratio, the loan loss provisions have inverse but the level of equity and funding gap positively affect bank profit. They found no evidence for the SCP hypothesis but the macroeconomic variables like interest rate variability and GDP growth rate affect banking profit negatively but market interest rate positively.

Goddard et al. (2004) also studied the bank profitability on European banking profitability and found no evidence for size-profitability relationship but positive effect of capital assets ratio on bank profit. Pasiouras et al. (2007) found significant positive relationship between banking profit

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[3] The theory of expense preference hypothesis suggests that high profits earned by firms in a regulated industry may be appropriated in the form of higher payroll expenditures [see Molyneux and Thornton(1992) for further explanation].

and equity level, liquidity position, concentration, inflation and GDP growth rate but significant negative relationship between the banking profit and cost of fund and size variables in their banking profitability studies on 15 EU countries.

Athanasoglu et al. (2008) studied the banking profitability determinants on Greek banking and found that equity level, productivity inflation and cyclical output have significant positive relationship with bank profitability while that with loan loss provision and operating expenses is significantly negative. Their study also accounted no bank size-profitability relationship of the traditional SCP hypothesis.

In a recent study of Dietrich et al. (2011) on the Swiss banking profitability found equity to total assets ratio, cost-income ratio, deposit growth rate, funding cost, interest income share, effective tax rate and ownership structure negatively affect banking profit. On the other hand, prolonged banking experience, small banking over large one, GDP growth, and term structure of interest rate found positive relationship. They also accounted for the particular focus on the crisis and pre-crisis of the global finance. Albertazzi et al. (2009, 2010) studied the bank profitability with particular importance to the business cycle changes and the taxation effect.

Previous literature on the determinants of banking profitability studied extensively on the microeconomic determinants; sources of which are the financial statements of the banks. Investigative results also found on the traditional structure-conduct-performance hypothesis and the macroeconomic determinants of the bank profitability. However we did not find any conclusive deterministic role of the determinants whether bank, industry or macroeconomic specific.

We found that the previous literature ignored the importance of the recurring earning power which is actually the ability of the excellent management of a bank to generate consistent profit. We extended the literature of bank profitability studies by incorporating this bank specific variable in our empirical study. The study considered the sample of the South Asian countries banking markets as a whole that is also new because no evidence of such study found in the past literature. Furthermore, the panel data of 259 commercial banks for the period of 1997-2012 which is relatively large that we studied empirically will allow the better insight into the factors determining the banking profitability.

3. Empirical Approach

3.1. Econometric Model

The general model to be estimated for profitability determinants of banks is of the following linear form:

$$\Pi_{itk} = c + \sum_{j=0}^{J} \beta_j X_{it}^j + \sum_{l=0}^{L} \beta_l X_{it}^l + \sum_{m=0}^{M} \beta_m X_{it}^m + \varepsilon_{it}$$

$$\text{where, } \varepsilon_{it} = v_i + \upsilon_{it} \text{ ......Equation (1)}$$

Where, Π_{itk} is the profitability of bank i at time t and measured at parameter k (k = ROA_{it} and ROE_{it}) with i = 1,.....,N, t = 1,....., T and c is a constant term. The superscripts *j, l* and *m* of X_{it} denote the bank-specific, industry specific and macroeconomic specific determinants respectively. ε_{it} is the disturbance with v_i the unobserved bank-specific effect and υ_{it} the idiosyncratic error. The error components of the regression model also distributed as v_i ~IIN (0, σ_v^2) and independent of υ_{it} ~ IIN (0, σ_υ^2).

Bank profits show a tendency to persist over time, reflecting impediments to market competition, informational opacity and/or sensitivity to regional/macroeconomic shocks to the extent that these are serially correlated (Berger et al., 2000). Hence, we adopted a dynamic specification of a model that includes a lagged dependent variable among the regressors. The dynamic specification model of the profitability determinants is:

$$\Pi_{itk} = c + \delta\Pi_{i,t-1,k} + \sum_{j=0}^{J}\beta_j X_{it}^j + \sum_{l=0}^{L}\beta_l X_{it}^l + \sum_{m=0}^{M}\beta_m X_{it}^m + \varepsilon_{it} \qquad ..\text{Equation (2)}$$

Where, $\Pi_{i,t-1}$ is the one-period lagged profitability at k parameter and δ is the speed of adjustment to the equilibrium. A value of $0 < \delta < 1$ implies the persistence of profitability in the industry but tends to return to the normality level. $\delta \sim 0$ with high speed in a fairly competitive market and $\delta \sim 1$ (slow adjustment) implies a less competitive market.

Literature usually applies the fixed effects (FE) or the random effects (RE) modeling in static type of relationships but in dynamic relationships these models produce biased (especially when time dimension T gets smaller) and inconsistent estimates (see Baltagi, 2001).

Following Athanasoglu et al. (2008) we precede the following five step issues for the econometric model of profitability determinants.

Firstly, we tested our data for non- stationarity using the Fisher test which does not require a panel to be balanced. This test is a question when the use of a relatively large T in a model of

bank profitability may be criticized on grounds of non-stationarity. The null of non-stationarity has been rejected at 1% level[4].

Secondly, we examined whether the individual effects are fixed or random. The relevant Hausman test on model (2) confirms the evidence in favor of a FE modeling[5]. Also the estimation result confirms the existence of individual effect since the F-statistics is significant (F (81, 204) = 2.49, Prob > F = 0.0000). However, the least square (within) estimator of the FE model in the presence of a lagged dependent variable among regressors is both biased and inconsistent[6].

Thirdly, we proceed with the estimation of our model using the one step generalized methods of moments (GMM) estimator of Arellano and Bond (1991) paradigm which suggest that consistency and efficiency gains can be obtained by using all available lagged values of the dependent variable along with the exogenous regressors as instruments.

Fourthly, we dealt with the problem of endogenuity with estimation of bank profitability. The question is whether capital variable (E/TA) and the credit risk variable (NPL/TL) are endogenous and predetermined or not. Theory suggest that capital and risk variables should be treated as endogenous and predetermined respectively when we measure profitability with ROE as dependent variable. To confirm such, we ran the same model twice separately in case of ROA and ROE respectively. First time we treated both variables as strictly exogenous and second time

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[4] The relevant chi-squared(χ^2, 296) -value for ROA = 1056.92 with ρ = 0.0000 and ROE = 980.83 with ρ = 0.0000

[5] The relevant Hausman test chi-squared(χ^2, 13) –value = 496.72 with prob>chi2 = 0.0000

[6] The Monte Carlo studies that measured the corresponding bias in the coefficients of the lagged dependent variables have found that the bias is significant for small values of T but goes to zero as T increases (see Judson and Owen, 1999).

treated capital as endogenous and risk variable predetermined. Sargan test[7] for over-identifying restrictions indicates that no endogenuity and pre-deterministic assumptions are valid for ROA as dependent variable but opposite for ROE. That means we treated capital and risk variable exogenous in ROA model but capital variable as endogenous and risk variable pre-determined in ROE model.

Finally, we addressed the unobserved time effects in the error components of our model as follows:

$$\Pi_{itk} = c + \delta\Pi_{i,t-1,k} + \sum_{j=0}^{J} \beta_j X_{it}^j + \sum_{l=0}^{L} \beta_l X_{it}^l + \sum_{m=0}^{M} \beta_m X_{it}^m + \varepsilon_{it}$$

$$\textbf{where}, \ \boldsymbol{\varepsilon_{it} = \nu_i + \lambda_t + \upsilon_{it}} \ ......\text{Equation (3)}$$

Where λ_t is the unobservable time effect and we tested the joint significance of time effects as $\boldsymbol{H_0 = \lambda_2 = \lambda_3 = \lambda_T = 0}$. The relevant LM test[8] approves the inclusion of time dummies. We experimented for time dummies for all years jointly and separately but found the year dummies 2009 is significant (implying the late hit of the global recession in the sample region). Considering all these, we estimated the profitability determinants by the following dynamic equation:

$$\Pi_{itk} = c + \delta\Pi_{i,t-1,k} + \sum_{j=0}^{J} \beta_j X_{it}^j + \sum_{l=0}^{L} \beta_l X_{it}^l + \sum_{m=0}^{M} \beta_m X_{it}^m + \gamma D_{09} + \varepsilon_{it}$$

$$\textbf{where}, \ \boldsymbol{\varepsilon_{it} = \nu_i + \upsilon_{it}} \ ......\text{Equation (4)}$$

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[7] When we modeled E/TA and NPL/TL as exogenous variables, the $\rho = 0.00$ for both the models. In contrast, when we assumed E/TA as endogenous and NPL/TL as pre-determined, the $\rho = 0.00$ in ROA model but $\rho = 0.19$ in ROE model that means the use of instruments for these two variables are not acceptable in ROA model but acceptable in ROE model.

[8] chi2(12) = 24.52 and Prob > chi2 = 0.0173

3.2. Empirical determinants of bank profitability

We empirically studied the econometric model of bank profitability determinants developed in section 3.1 using 3 categories of proxy variables namely (a) firm specific, (b) industry specific and (c) macroeconomic specific (see table-1 for a summary of these variables).

3.2.1. The dependent variables

We used return on average assets (ROA) as the key profitability determinant of banks. ROA has emerged as the key ratio for the evaluation of bank profitability and has become the most common measure of bank profitability in the literature (Golin, 2001). ROA is an indicator of how profitable a company is relative to its total assets and gives an idea as to how efficient management is at using its assets to generate earnings. We defined ROA as the ratio of net income over average total assets expressed in percentage.

Return on average equity (ROE) is the second measure of profitability in our empirical study. We defined ROE as the amount of net income as a percentage of shareholders equity. ROE equals ROA time assets-equity ratio, often termed as equity multiplier or financial leverage. Problems of considering ROE as the profitability measure is authority often regulates the leverage position of a bank and also for accounting identity fact banks with lower leverage ratio generally report higher ROA but lower ROE. So, we considered ROA as the key determinant of bank profitability also relied on the average assets value to capture the changes during the fiscal year if any.

<Table 1>

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3.2.2. The explanatory variables

(a) Bank-specific explanatory variables

(i) Equity to Total Assets ratio

Equity to total assets ratio measures the capitalization strength of a bank considering the regulatory requirements regarding the minimum equity holdings (Islam et. al., 2015). Anticipating impact of this variable on bank profitability is complex. The traditional risk-return hypothesis (invested money can render higher profits only if it is subject to the possibility of being lost) imply a negative relationship between bank capital and profitability because banks with higher equity to asset ratios are relatively safer in the event of loss or liquidation. Also considering the Berger (1995) model of one-period perfect capital markets with symmetric information where a negative relationship between equity and profitability exists, capital variable should be modeled as endogenous. On the other hand, better capitalized banks can effectively transform their creditworthiness into lowering their cost of fund and generating higher profitability. This assumption gets solid ground considering the recent trend of merger and acquisition also the ace of financial liberalization. Finally we hypothesized a significantly positive relationship between equity and ROA but significantly negative relationship between equity and ROE.

(ii) Non-performing loan ratio

The ratio of nonperforming loan to total loan (NPL/TL) is the proxy variable for the credit risk exposure to a bank. Facing the high regulations from the regulatory bodies and maintaining the quality of assets (loan is the largest head of a bank balance sheet), banks focus to keep a lower non-performing loan ratio. Following this standard controlling nature, some literature term NPL

is a pre-deterministic variable (see Athanasoglu, 2008). However, we expect negative relationship between non-performing loan and profitability.

(iii)   Liquidity ratio

Maintaining a sound liquidity position to safeguard against the liquidity risk is a vital policy of a commercial bank. We calculated the liquidity ratio (LA/D&STF) as the liquid assets of a bank over the deposits and short term funding in percentage form. Although a higher liquidity ratio reduces the liquidity risk but at the same time reduces the loanable fund of a bank which in turns reduces the banks' earning potential. Thus we expect liquidity position of a bank and its profitability negatively related.

(iv)   Cost of fund ratio

Total interest expenses over total deposit (IE/TD) is a proxy for funding cost and used to measure the impact of bank managements' efficiency over banks profitability. A bank with its excellent managerial efficiency will be able to collect low cost fund in a competitive but unstructured savings of the depositors providing sound bank profitability. A negative and statistically relationship is expected.

(v)   Productivity ratio

In a world of increased globalization and deregulations, banks must increase the productivity (i.e. the input-output ratio) for a stable earning and sustainable growth. It is possible to linearize the productivity growth ($\delta\pi$) [9] in a capital augmented production function but difficult when

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[9] In the Cobb-Douglas production function, $Y = AL^{\beta}K^{\alpha}$ where L = labor, K = capital, A = total factor productivity, α and β are the output elasticities of capital and labor respectively, $\alpha + \beta < 1$ indicates

production function is labor augmented or both due to inefficiency of the workforce. Although it is a question whether bank performance (e.g. profitability, π) is capital or labor augmented, we expect positive relationship between productivity and profitability. We used the ratio of operating profit per employee as a proxy for productivity.

(vi)   Recurring earning power

We introduced the ratio of recurring earning power (REP)[10] of a bank in our econometric model of profitability determinants as a proxy for the stability of its earnings and sustainable managerial efficiency. REP is defined as the adjusted ratio of stable net income (profit before taxes plus loan loss provisions less income from associates and extraordinary sources over total assets). We found no significant evidence of studies on the relationship between the REP and bank profitability in the previous literature. We expect that managerial excellence and profitability are positively related.

(vii)   Growth rate of total deposit

As a financial intermediary, bank always eager to expand its market share of deposit in the deposit market in order to expand its loan operation. So, the impact of growth in deposit does not necessarily ensure the bank profitability. To crop up the advantage of higher deposit growth is related to the quality of credit management. Hence, the impact of this variable on bank profitability is not clearly anticipated in the present study.

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decreasing return to scale. But in a perfectly competitive market, $\alpha + \beta = 1$ meaning constant return to scale.

[10] This variable is different from the dependent variables ROA and ROE. We found ρ (ROA, REP) = 0.78 and ρ (ROE, REP) = 0.25 only (see table-5A of correlation matrix in the appendix).

(viii)   Bank size

We measured the bank size in terms of natural logarithm of its total assets. Although Smirlock (1985) argued that a growing bank size is positively related to bank profitability on the ground of economies of scale benefit but extremely large banks might become operationally inefficient due to bureaucratic complexity and 'too big to fail' reasons (Pasioras et. al., 2007). So, this size-profitability relationship is still unpredictable also in our study.

(ix)   Loan to deposit ratio

We introduced the loan to deposit ratio (TL/TD) in our bank profitability determinants model to see the impact of asset-liability management on profitability of a bank. Loan to deposit ratio components are also interest rate sensitive meaning these balance sheet components are also affected by the interest rate risk literally called the duration gap (difference between rate sensitive assets and rate sensitive liabilities). Higher the ratio indicates the bank is effectively utilizing its fund to generate higher profit although possible bank run problem is associated with this scenario. On the other hand, a lower TL/TD means banks have excess liquidity and under performing their asset-liability management. In this scenario, banks will incur the excess liquidity cost burden in addition to the cost of fund that will result a state of negative profitability. Entrop, O., et al. (2015) studied the relationship between duration gap and interest margin but the relationship between rate sensitive assets and liabilities with a bank's overall profitability (ROA or ROE) seems first we included in our present study. We expect a negative and significant relationship under the assumption of underperformance of asset-liability management.

(x)   Total interest income ratio

Total interest income over total loan (TII/TL) ratio indicates the loan pricing behavior of a bank. Certainly a commercial bank will try to charge higher on its loans and advances to optimize profit. Higher interest income will represents the higher profitability of a bank.

(xi)   Off-balance sheet income

Now a day banking business model has been diversified in many folds. Following Angbazo (1997), we examined the effect of off-balance sheet income on the banking profitability. In the name of loan commitments, standby letter of credit, commercial letter of credit, securities lending and trading, futures and forwards contracts, options, swaps, cards, service and penalty charges, capital gain on assets, property leasing etc. and other fee income, banks generate sizable portion of their total income. On the other hand, banks incur handsome operating and overhead expenses to generate off-balance sheet activities (Islam et. al. 2015). We calculated off-balance sheet income ratio as the net non-interest income (non interest expense less non-interest income) over total assets (NNII/TA) and expect positive impact of this variable on banking profitability.

(b). Industry-specific variables

(xii)   Hirschman-Herfindahl index

Hirschman-Herfindahl index (HHI) is the proxy variable for the market concentration and its impact on bank profitability in our empirical study. This is a common and widely used measure of market concentration where higher concentration means lower competition and vice versa and calculated as the sum of square of market share $(HHI = \sum s_i^2$ .where s_i is the share of total

industry assets of each bank as calculated in our study). According to the structure-conduct-performance (SCP) hypothesis, banks in highly concentrated markets earn monopoly rents, because they tend to collude (Gilbert, 1984). This state of collusion may direct opposite scene also where smaller banks face tougher competition that result overall negative profitability. So, the theoretical relationship between concentration and bank performance is yet indeterminate and to be answered empirically.

(c). Macroeconomic-specific variables

(xiii)   Term structure of interest rate

We used the difference of yield spread of 10 year and 5 year treasury bonds as the proxy of term structure of interest rate (R) and its impact on the bank profitability. Maturity gap (borrowing short- lending long and vice versa) management is an important aspect of bank management because of interest rate sensitivity. Banks' revenues and costs will be adjusted with different speeds that will generate either profit or loss for the bank (Flannery, 1984). In a perfectly competitive capital market, where the banks also compete with the government to collect funds may expect inverse relationship with the term structure of interest rate and its profitability.

(xiv)   Rate of inflation

Although there is no empirical consensus on the effect of inflation on the bank profitability, high inflation is generally associated with high interest rates and consequently increases bank profitability. In this study, we expect positive relationship with inflation and bank profit.

(xv)   GDP growth rate

Gross domestic product (GDP) growth rate affect the demand and supply of loans and deposits directly and thus influence the banking business. We assume that sound GDP growth ensures the

stability of the economy and in that stable economic environment a bank's business risk reduces significantly. Following that risk return trade off banks profitability may reduce. Hence, we expect inverse relationship with GDP growth and bank profitability.

4. Data and sample description

To prove the econometric model of bank profitability determinants (equation 4) empirically we studied the unbalanced panel data of 259[11] South Asian banks over the period of 1997-2012. We defined banks as the financial intermediary who takes deposits and provide loans and advances in the ordinary courses of business. We excluded the data of Islamic banks from our sample as in India and Nepal there is no or very limited Islamic banking operation. For our analyses, we collected data from various sources. The dependent variable and the bank specific explanatory variables, we collected data from the *Bureau Van Dijk's Bank Scope database* (Bank Scope 2013) using the universal model of banking database. We took the primary data set from the Bank Scope but calculated by our own to get the Hirschman-Herfindahl index which we used as the industry specific explanatory variables. Finally, for macroeconomics specific variables, we collected data from two sources. We collected the data regarding the term structure of interest rate[12] from the *central banks websites* of the respective countries included in our study. From *International Financial Statistics (IFS) database (IFS 2014)*, we collected yearly data of rate of inflation and the growth rate of gross domestic product (GDP).

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[11] By countries, India represents 60% banks in our total sample while Bangladesh, Nepal and Pakistan represent 12%, 10% and 18% respectively.

[12] Term structure of interest rate is proxied as the difference between the yields spread of 10 year and 5 year Treasury bonds (T-bond). Also for Nepal, we sampled the development bond yield as the equivalent to 5 year T-bond and the national savings certificates yield as equivalent to 10 year T-bond as they have no such classified maturity bonds.

Table-2 in the following presents the descriptive statistics of the empirical variables used in the present study. We see in South Asia, banks earned around 1% ROA while ROE was more than 14%. Among other key indicators, the non-performing loan to total loan ratio was quiet high (more than 8%) and the cost of fund averaged a slightly higher than 6.6%. Off balance sheet income was sound good meaning well diversified banking activities in the region. HHI over 13% means a fairly competitive banking industry.

<Table 2>

During the sample period rate of inflation was in single digit (7%) seems satisfactory and the regional average GDP growth rate was more than 6%. Figure-1 in the following presents the average yield spread of long term T-bond and that was a slightly higher than 1%.

<Figure 1>

5. Empirical results

Table 3 in the following presents the regression output of equation 4 of the key bank profitability determinants (ROA) for the total sample period of 1997-2912. The first column of the table presents the list of the dependent and the deterministic variables while each column of model 1 and 2 represents the coefficient and standard error respectively. To see the stability and the significant of the coefficients, in model 1 we included all of the determinants while in model 2 only the bank-specific variables.

The Wald-test confirms the fine goodness of fit of our panel data set and the Sargan-test shows no evidence of over-identifying restrictions. According to the results of AB (AR1) test a negative

first order autocorrelation exists but does not imply the inconsistency of the estimates. Inconsistency would imply if there is the second-order autocorrelation (Arellano and Bond, 1991) but is rejected by AB (AR2) test subsequently.

Empirical results show a low degree of profit persistence in banking as the one-period lagged dependent variable (δ (L1.ROA) = 0.1076) is statistically significant also justify the use of GMM dynamic panel estimation of our model. This level of profit persistency in the South Asian region seems similar market competition to the European region as Goddard et al. (2004) found statistical evidence of weak profit persistency.

Among the bank-specific determinants, results show that capital plays a strong determinant of bank profitability. As expected, equity to total assets ratio positively and significantly affect ROA. Economically speaking for every 100 basis point (BP) increase in this variable will increase a bank ROA by over 16 BP. Also the rejection of endogenuity of equity variable confirms the existence of sound one-period perfect capital markets (Berger, 1995) in the region.

We found the expected negative coefficient of credit risk (NPL/TL) variable but statistically insignificant. The negative and highly significant coefficient of liquidity ratio (LA/D&STF) indicates the banks are in excess liquidity and thus under utilization of assets emerge. As seen banks forego around 3 BP of ROA for every 1% increase in LA/D&STF. Cost of fund negatively affects bank profitability as obvious.

One alarming finding of the present study is the statistically significant and negative coefficient of the productivity ratio (OP/NoE) seems the inefficiency of the production inputs particularly the employees. As we discussed in section 3.2, in a state of decreasing return to scale such outcome will occur. Another indication of the result is probably in South Asian banking labor is

dominating over technology and well behind the banking progress all over the world. Technological advancement and digitalization of banking may rescue the banks (Athanasoglu et al., 2008) from this poor productivity of the employees of South Asian banking.

We found our expected positive and statistically significant relationship between the recurring earning power and banking profitability. Recurring earning power fits as a very good proxy for managerial excellence who generates more profit and pays more taxes, effectively manages the loan loss provisions and generates income from associates. Economically for every 1% increase in the recurring earning power will add around 73 BP on ROA.

The present study found no statistical evidence that deposit growth rate and a bank size affect bank profitability. But rate sensitive assets and rate sensitive liabilities (TL/TD) ratio negatively and significantly affect the profitability of banking. Although the economic impact seems very small, probable explanation for the negative coefficient may be the portfolio managers were less aware regarding maturity gap and credit quality.

<Table 3>

We split the total income of a bank into interest income and off balance sheet income to check which portion significantly affects the bank profitability. We found positive coefficient for both the determinants but only found the off balance sheet income significantly affect the bank profitability when we considered only the bank-specific determinants (model 2).

Our empirical studies found negative but statistically insignificant coefficient for Hirschman-Herfindahl index. Berger (1995) and also other recent studies claim that concentration is usually negatively related to profitability once other effects are controlled rejecting the traditional SCP hypothesis. In this study we found the low degree of profit persistency and size has no significant

effect on bank profitability that also support that in the South Asian banking market is fairly competitive and exist few scope of monopoly rent seeking behavior.

Turning to the macroeconomic determinants of bank profitability, we found the term structure of interest rate; rate of inflation and the GDP growth rate all significantly influence the banking profitability. The significant negative coefficient of term structure of interest rate indicates that banks do compete with government to satisfy the depositors to retain their savings. This hypothesis confronts the recent studies of Albertazzi et al. (2009) but support the findings of Fraser et al. (2002). Economically banks lose approximately 19 BP of profit for every 100 BP increase in the term structure of interest rates.

As expected, the significant positive influence of inflation on bank profitability indicates that the bank managers effectively anticipated the future upward movement of inflation but remains unanticipated by the bank clients. This existence of asymmetric information made some way of profit in South Asian banking.

We also prove our hypothesis that in an expansionary economy banks operate their business in a relatively ease and less risky environment and thus can charge less from their customers. Hence we got negative coefficient of GDP growth rate as the determinant of bank profitability.

Finally, one of the important findings of our empirical studies on bank profitability determinants is the significant reduction of profitability in the South Asian countries as we term as the late hit of the global recession in the region. Our results show that banks approximately lose 26 BB of ROA in the year 2009.

Table 4 in the following presents the regression output of the return on average equity (ROE) as the bank profitability measure. Overall we found consistent but relatively inferior coefficients

and their statistical significant compared to return on average assets (ROA) as the bank profitability measure. Notably, we found significant negative coefficient of equity to total assets (E/TA) ratio proving our in- deterministic hypothesis discussed in section 3.2.2. That means increases in the amount of equity subsequently decrease the ROE. We also confirmed the profit persistency state in the sample region as the lagged ROE is positive and significant and SCP hypothesis still in effect in South Asian banking when we considered ROE as the measure of bank profitability.

Here we also report that our regression estimates are robust as we checked by alternative variables. For purpose, we used CR3[13] as alternative to HHI and standard deviation of short term interest rates[14] as alternative to the term structure of interest rate variables for robustness check. We found no significant change in the values of the coefficients or their level of significance during the robustness check.

<center><Table 4></center>

6. Conclusions and implications

Using a comprehensive cross-country panel data set with micro and macro level variables, this paper presents the empirical results on how bank specific, industry specific and macroeconomics specific factors affect the bank profitability. We followed the single stage model of profit determinants for the empirical study that included four South Asian countries' that is Bangladesh,

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[13] CR3 is the concentration ratio of the largest 3 banks in the industry in terms of total assets as we used in the present study.
[14] We used the annualized standard deviation of monthly average of daily call money rates and data collected from the web sites of the central banks of the sample countries included in this study and later our own calculation.

India, Nepal and Pakistan banking sector data covering the period of 1997-2012. Our empirical findings are consistent with our theoretical analysis.

Among the bank specific determinants, we found that equity level which is the proxy of financial strength and the recurring earning power of a bank positively affects its profitability. On the other hand, liquidity position of a bank, funding gap, cost of fund and productivity ratio found negatively and significantly affect banking profit.

We found no evidence to support for the traditional SCP hypothesis as the proxy variable HHI was insignificant. Among the macroeconomic determinants we found the term structure of interest rate and macroeconomic growth rate of a country negatively influence bank profitability while inflation affect that positively.

The novel feature of our study is we successfully traced the significant deterministic role of managerial excellence in the name of recurring earning power on which previous literature paid little attention. Though it is low but significantly positive profit persistency behavior in the sample region justify our use of GMM estimator, an up-to date econometric methodology that we effectively addressed the issues that profits show a tendency to persist over time, reflecting impediments to market competition, informational opacity and/or sensitivity to regional/macroeconomic shocks. Our empirical result also shows that a late-hit of the global financial crisis affected the banking profitability in the South Asian countries.

Regarding the policy implications, we suggest the banks to take appropriate actions so that the credit risk would have appropriate reflection in banking profit as we found no significant negative impact of default probability on banking profit that is contradictory to the established theory. Another issue for both the bank management and the regulatory authority to implement

the digitalization and through to the state to electronic banking as the productivity ratio shows negative impact on banking profit indicating inefficient manpower. Hoping these initiatives will benefit the society as a whole.

In this paper, we comprehensively addressed the question of how microeconomic and macroeconomic forces affect banking profitability. However, studies on a number of additional explanatory variables like corporate tax rates, competition among banks and other financial institutions, ownership structure, deposit insurance, rate of unemployment, information asymmetry, and portfolio effect, those could not be tested due to limitation of data and the degrees of freedom or for the potential multicollinearty problem, would be tested as the extension of the model. Implementing contemporary econometric methodology in the model would be fruitful insight of the literature and apparently an interesting path for future research.

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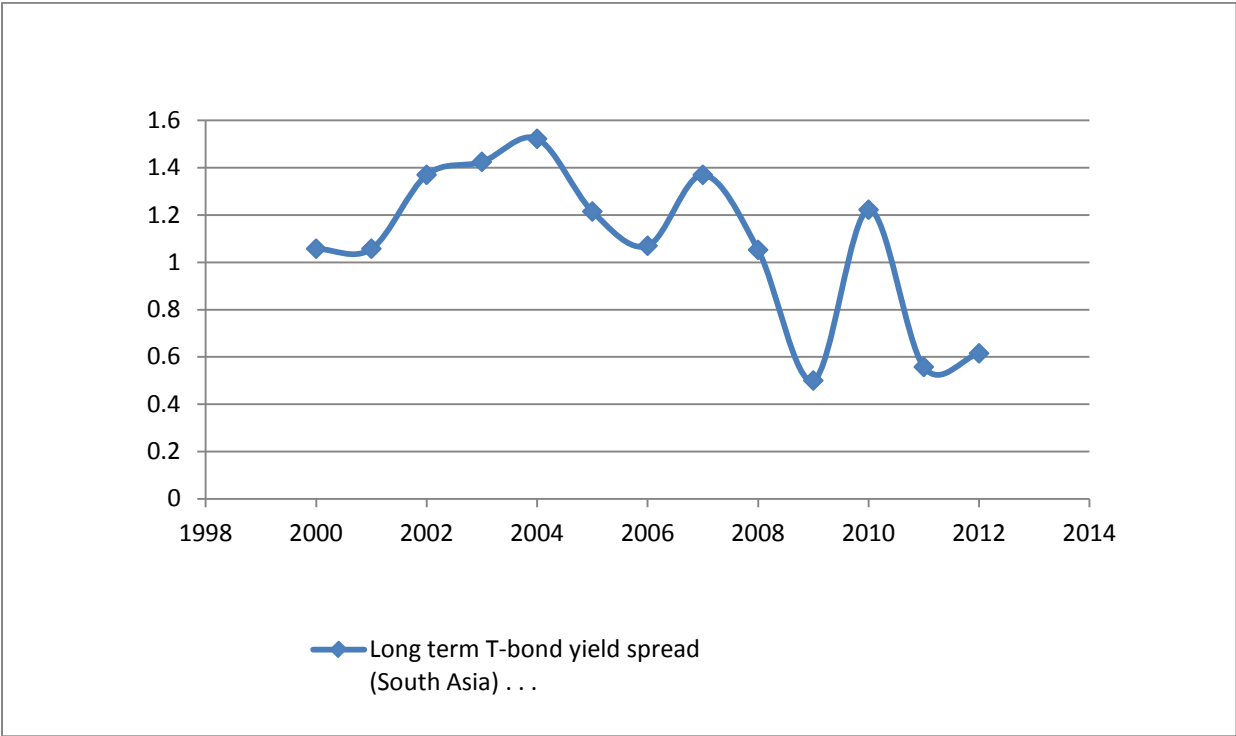**Figure 1: Long term average Treasury bond yield spread in South Asia**

Long term T-bond yield spread (South Asia) . . .

Table-1: Description of variables used in the study

Variables	Notation	Description	Expected effect
Dependent variables			
	ROA	Net income over average total assets (%)	
Profit(Π)	ROE	Net income over average total equity (%)	
Independent variables			
(a). Bank-specific variables			
i. Equity to total assets ratio	E/TA	Equity to total assets ratio (%) is a measure of capital adequacy of respective bank	+/-
ii. Non-performing loan ratio	NPL/TL	Non-performing loan (%) over total loan is a proxy variable for credit quality or credit risk exposed to a bank	-
iii. Liquidity ratio	LA/D&STF	Liquid asset to total deposits and short term funding ratio (%) express the liquidity position of a bank	-
iv. Cost of fund ratio	IE/TD	Total interest expenses (%) over total deposit is a proxy for funding cost	-
v. Productivity ratio	OP/NoE	Operating profit per employee	+
vi. Recurring earning power	REP	Adjusted ratio of stable net income(net income less non stable earnings and taxes) over total assets	+
vii. Growth of total deposit	ΔTD	Annual growth rate (%) of deposit	+/-
viii. Bank size	ln(TA)	Natural logarithm of total assets of a bank	+/-
ix. Loan to deposit ratio	TL/TD	Total loan over total deposit ratio (%)	-
x. Interest income to Total loan ratio	TII/TL	Total interest income over total loan (%)	+
xi. Off-balance sheet income ratio	NNII/TA	Net non-interest income over total assets (%)	+
(b). Industry-specific variables			
xii. Hirschman-Herfindahl index	HHI	Sum of square of market share is a proxy for market structure variable	+/-
(c). Macroeconomic-specific variables			
xiii. Term structure of interest rate	R	Interest rate of 5 year treasury bill (%)	+/-
xiv. Rate of inflation	%Inf	Annual rate of inflation (%)	+
xv. Economic growth rate	%ΔGDP	Real economic growth rate as a % change in GDP	-

Table-2: Descriptive statistics

Name of the Variables	No of Observation	Mean	Standard Deviation
Return on Asset (ROAA)	1558	0.9949936	3.374581
Return on Equity (ROAE)	1557	14.01718	52.96104
Equity to Total Asset ratio (E/TA)	1565	9.988326	12.38309
Non-performing loan ratio (NPL/TL)	1166	8.343208	10.40563
Liquidity ratio (LA/D&STF)	1552	19.71283	28.85115
Cost of fund ratio (IE/TD)	1543	6.600652	6.895042
Productivity ratio (OP/NoE)	866	1.81713	17.55766
Recurring earning power (REP)	1558	2.202445	3.429645
Growth rate of total deposit (GTD)	1404	2.8564906	11.30089
Size (lnTA)	1565	7.186992	2.054729
Loan to deposit ratio (TL/TD)	1488	82.38909	63.00418
Total interest income ratio (TII/TL)	1082	72.37875	19.44414
Off-balance sheet income (NNII/TA)	1556	0.8787875	3.314843
Hirschman- Herfindahl index (HHI)	3744	0.1360505	0.1156652
Term structure of interest rate (R)	2265	1.074119	1.22368
Rate of inflation (Inf%)	3397	7.026147	3.411614
GDP growth rate (GDP%)	3370	6.136493	2.259228

Table-3[15]: Determinants of bank profitability (ROA) in South Asia, 1997-2012, total sample

Variables	Model-1(all determinants)		Model-2 (only bank-specific determinants)	
Dependent variable: Return on average Assets (ROA)	Coefficient	Standard error	Coefficient	Standard error
L1.ROA	.10760625*	0.056919	.16700547***	0.046182
Equity to Total Asset ratio	.15133647***	0.028000	.1339632***	0.023350
Non-performing loan ratio	-0.007028	0.019252	-0.016082	0.013626
Liquidity ratio	-.04288614***	0.010198	-.03681156***	0.008665
Cost of fund ratio	-.16775388***	0.052754	-0.059857	0.036788
Productivity ratio	-.43347373***	0.068875	-.32035509***	0.051464
Recurring earning power	.75176167***	0.118623	.73583202***	0.093714
Growth rate of total deposit	0.000046	0.000050	0.000020	0.000042
Size	0.175360	0.226166	0.092553	0.150589
Loan to deposit ratio	-.01439217**	0.006367	-.01490682***	0.005026
Total interest income ratio	0.000035	0.000046	0.000043	0.000028
Off-balance sheet income	0.112275	0.141199	.21824237**	0.102645
Hirschman-Herfindahl index	-0.345839	0.074956		
Term structure of interest rate	-.19451958***	0.024386		
Rate of inflation	.05226083**	0.043628		
GDP growth rate	-.07972443*	0.155230		
Year 2009 (Dummy)	-.25603382*	0.666215	-.23035388**	0.115331
Intercept	0.259592	1.911693	-0.214456	1.373978
Wald-test	*Chi2(17) = 350.85*		*Chi2(13)= 457.42*	
Sargan-test	*Chi2(95)=166.31*		*Chi2(104)=253.85*	
AB test AR(1)	*z=-1.75*		*z=-1.89*	
	p-value= 0.07		*p-value=0.05*	
AB test AR(2)	*z=-1.1136*		*z= -1.3114*	
	p-value=0.2655		*p-value= 0.1897*	

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[15] The table reports the regression output from GMM estimation of the bank profitability determinants. Coefficients that are significantly different from zero at the 1%, 5% and 10% level are marked with ***, **, and * respectively. Sargan test is the test for over-identifying restrictions in GMM dynamic model estimation. AB test AR(1) and AR(2) refer to the Arellano-Bond test that average auto covariance in residuals of order 1 and order 2 is 0 (H_0: no auto correlation).

Table-4[16]: Determinants of bank profitability (ROE) in South Asia, 1997-2012, total sample

Variables	Model-1(all determinants)		Model-2 (only bank-specific determinants)	
Dependent variable: Return on average Assets (ROE)	Coefficient	Standard error	Coefficient	Standard error
L1.ROE	.52418001***	0.113610	.42597704***	0.081668
Equity to Total Asset ratio	-3.9676741***	0.667903	-4.1063285***	0.519022
Non-performing loan ratio	0.182756	0.514501	-0.318888	0.302206
Liquidity ratio	-0.222673	0.220849	-0.093891	0.179014
Cost of fund ratio	-3.0388376**	1.240529	-0.808211	0.773543
Productivity ratio	0.232178	1.596769	-0.070620	1.164588
Recurring earning power	3.633552	2.661615	4.3750678**	2.032838
Growth rate of total deposit	0.000389	0.001214	-0.000337	0.000993
Size	6.868638	4.956729	0.600586	2.792117
Loan to deposit ratio	0.037761	0.138309	0.028622	0.107174
Total interest income ratio	0.000589	0.001010	0.000406	0.000582
Off-balance sheet income	2.188804	3.250615	-1.109140	2.242806
Hirschman-Herfindahl index	28.088533*	1.730980		
Term structure of interest rate	2.002792	0.560012		
Rate of inflation	-0.037337	1.043490		
GDP growth rate	-0.807143	3.691096		
Year 2009 (Dummy)	-8.4449765**	15.410420	-7.5645774***	2.654180
Intercept	-4.430819	41.456540	32.265954	25.317280
Wald-test	*Chi2(17) = 135.91*		*Chi2(13)= 185.76*	
Sargan-test	*chi2(179) = 194.36*		*Chi2(247)=325.91*	
AB test AR(1)	*z=-1.7045*		*z=-1.82*	
	p-value= 0.0883		*p-value=0.068*	
AB test AR(2)	*z=-.69844*		*z= -.783*	
	p-value=0.4849		*p-value= 0.4336*	

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[16] The table reports the regression output from GMM estimation of the bank profitability determinants. Coefficients that are significantly different from zero at the 1%, 5% and 10% level are marked with ***, **, and * respectively. Sargan test is the test for over-identifying restrictions in GMM dynamic model estimation. AB test AR(1) and AR(2) refer to the Arellano-Bond test that average auto covariance in residuals of order 1 and order 2 is 0 (H_0: no auto correlation).

Appendix

Table-A5: Correlation matrix*

	roa	roe	eta	npltl	ladstf	cof	opnoem	rep	gtd	lnta	ld	tiitr	nniita	hhi	ltint	inf	gdp
roa	1.00																
roe	-0.02	1.00															
eta	-0.14	-0.01	1.00														
npltl	-0.39	-0.52	-0.02	1.00													
ladstf	-0.03	-0.02	0.33	0.06	1.00												
cof	-0.37	-0.24	0.36	0.31	-0.24	1.00											
opnoem	0.21	0.36	0.17	-0.33	0.03	0.02	1.00										
rep	0.78	0.25	-0.03	-0.44	-0.05	-0.29	0.48	1.00									
gtd	0.00	-0.01	0.01	0.04	0.11	-0.09	-0.05	0.01	1.00								
lnta	-0.03	0.11	-0.23	-0.04	-0.56	0.06	0.07	0.03	-0.17	1.00							
ld	0.04	-0.02	0.20	-0.02	0.04	0.11	-0.02	0.08	0.01	-0.09	1.00						
tiitr	-0.06	0.00	-0.10	-0.04	-0.12	0.06	-0.06	-0.11	-0.01	0.13	-0.05	1.00					
nniita	-0.49	-0.23	0.29	0.37	0.26	0.14	-0.49	-0.68	0.04	-0.16	-0.03	0.07	1.00				
hhi	0.10	0.08	-0.02	-0.20	0.25	-0.07	0.13	0.04	0.07	-0.40	-0.01	-0.06	0.00	1.00			
ltint	0.12	0.14	-0.11	-0.15	0.25	-0.38	-0.01	0.14	0.03	-0.42	0.01	-0.10	-0.18	-0.02	1.00		
inf	-0.17	-0.18	0.25	0.29	-0.01	0.34	0.00	-0.17	0.04	0.19	0.05	0.07	0.33	-0.01	-0.31	1.00	
gdp	0.08	0.08	-0.13	-0.31	-0.27	-0.11	0.03	0.04	0.09	0.34	-0.05	0.02	-0.24	-0.13	-0.23	-0.39	1.00

*Output of Stata

** Refer to the table -2 of descriptive statistics for elaboration of the names of the variables